

I claim:

1. An automated power-driven pool cleaning apparatus utilized for cleaning a surface of a wall of a pool or tank and including a programmable control device for directing movement of said apparatus across the wall, said apparatus comprising:

5 a motion translating member mounted for contacting the surface of the wall being cleaned, said motion translating member moving as said apparatus moves across the wall;

a signal transmitter for transmitting signals in accordance with movement of said motion translating member; and

10 a sensor mounted to receive signals from said signal transmitter and for providing an output indicative of signals received to the control device,

wherein the programmable control device is programmed to change a direction of movement of said apparatus when the output of said sensor indicates that said apparatus has not moved within a prescribed period of time.

2. The apparatus of claim 1, wherein said signal transmitter is responsive to normal movement of said motion translating member to transmit at least one signal during each unit of time equal in duration to the prescribed period of time, and wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when no signal is received by said sensor within the prescribed period of time.

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3. The apparatus of claim 2, wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when a signal is constantly received by said sensor for the prescribed period of time.

4. The apparatus of claim 1, wherein said motion translating member includes a wheel mounted for rotation on an axis transverse to the direction of movement of said apparatus.

5. The apparatus of claim 4, wherein a portion of said wheel in contact with the surface of the wall is provided with a traction surface.

6. The apparatus of claim 5, wherein said traction surface is a polymeric material having a high coefficient of friction.

7. The apparatus of claim 1, wherein said motion translating member includes a spherical element supported by ball bearings.

8. The apparatus of claim 1, wherein said motion translating member includes a wheel that rotates as said apparatus moves across the wall, said signal transmitter being mounted on said wheel to move as said wheel rotates.

9. The apparatus of claim 8, wherein said signal transmitter is mounted to rotate with said wheel.

10. The apparatus of claim 9, wherein said signal transmitter is mounted on said wheel at a periphery of said wheel.

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11. The apparatus of claim 9, wherein said sensor is mounted on said apparatus at a position where said sensor receives or does not receive a signal from said signal transmitter in dependence upon a rotational position of said wheel.

12. The apparatus of claim 11, wherein said sensor is mounted on said apparatus at a position that said signal transmitter is alternately proximate to and distanced from as said wheel rotates, said sensor receiving a signal from said signal transmitter when said signal transmitter is proximate to said sensor, and said sensor not receiving a signal from said signal transmitter when said signal transmitter is distanced from said sensor.

13. The apparatus of claim 12, wherein said signal transmitter includes at least one permanent magnet mounted at said periphery of said wheel.

14. The apparatus of claim 13, wherein said sensor includes a reed switch that moves between an open and a closed position in dependence upon whether said at least one permanent magnet is proximate to or distanced from said reed switch.

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15. The apparatus of claim 14, wherein said wheel is sized such that said at least one permanent magnet is proximate to said reed switch at least once during each unit of time equal in duration to the prescribed period of time during normal movement of said motion translating member to transmit at least one signal, and wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when no signal is received by said sensor within the prescribed period of time.

16. The apparatus of claim 15, wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when a signal is constantly received by said sensor for the prescribed period of time.

17. The apparatus of claim 14, wherein said signal transmitter includes at least two permanent magnets mounted at said periphery in diametrically opposed relation to each other.

18. The apparatus of claim 1, further comprising a support assembly for urging said motion translating member into contact with the surface of the wall being cleaned.

19. The apparatus of claim 18, wherein said support assembly comprises a spring-biased shaft mounted for movement in a direction generally normal to the

surface of the wall being cleaned, whereby said motion translating member is maintained in contact with irregularities in the surface.

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20. The apparatus of claim 19, wherein said support assembly includes a mounting bracket for receiving said spring-biased shaft and a bearing surface for said motion translating member.

21. The apparatus of claim 20, wherein said motion translating member is a wheel and said bearing surface is an axle.

22. The apparatus of claim 20, wherein said motion translating member is a sphere and said bearing surface comprises a plurality of ball bearings and a housing.

23. The apparatus of claim 20, wherein said motion translating member is a continuous flexible belt and said bearing surface comprises a plurality of rotationally-mounted pulleys.

24. The apparatus of claim 1, wherein said signal transmitter comprises a light element for intermittently transmitting light to said sensor.

25. The apparatus of claim 24, wherein said light element is responsive to normal movement of said motion translating member to transmit light to said sensor at least once during each unit of time equal in duration to the prescribed

period of time, and wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when no light from said light element is received by said sensor within the prescribed period of time.

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26. The apparatus of claim 25, wherein the output of said sensor indicates that said apparatus has not moved within the prescribed period of time when light from said light element is constantly received by said sensor for the prescribed period of time.

27. The apparatus of claim 24, wherein said light element includes a light source and means for intermittently transmitting light from said light source to said sensor.

28. The apparatus of claim 27, wherein said light source is fixed and said means for intermittently transmitting comprises at least one portion of said motion translating member that transmits light in spaced relation to at least one portion of said motion translating member that blocks passage of light, such that movement of said motion translating member interrupts light received by said sensor from said light source.

29. The apparatus of claim 1, wherein said signal transmitter is a light source and said sensor is a photoelectric cell.

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30. The apparatus of claim 1, wherein the prescribed time is about five seconds

31. A method for controlling movement of an automated power-driven pool cleaning apparatus utilized for cleaning a surface of a wall of a pool or tank, the apparatus comprising a programmable control device for directing movement of the apparatus across the wall, said method comprising the steps of:

5 providing a motion translating member mounted on the apparatus for contacting the surface of the wall being cleaned, the motion translating member including at least one signal transmitter that moves as the apparatus moves across the wall;

10 providing a sensor mounted on the apparatus to receive signals from the signal transmitter;

transmitting signals from the signal transmitter relative to the movement of the motion translating member;

15 outputting from the sensor to the programmable control device, an output signal that is indicative of signals received from the signal transmitter by the sensor; and

changing a direction of movement of the apparatus under control of the programmable control device when the output indicates that the apparatus has not moved within a prescribed period of time.

32. The method of claim 31, wherein said signal transmitting step is responsive to normal movement of the motion translating member transmitting at

least one signal during a predetermined unit of time equal in duration to the prescribed period of time, and wherein the sensor output signal indicates that the apparatus has not moved within the prescribed period of time when no transmitter signal is received by the sensor within the prescribed period of time.

33. The method of claim 32, wherein the sensor output signal indicates that the apparatus has not moved within the prescribed period of time when a signal is constantly received by the sensor for the prescribed period of time.

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